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PATENT
ATTORNEY DOCKET NO.: 051481-5047-01

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DEC 17 2001
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: John E. COOK *et al.*

Application No.: 09/165,772

Filed: 2 October 1998

For: TEMPERATURE CORRECTION METHOD AND SUBSYSTEM FOR AUTOMOTIVE EVAPORATIVE LEAK DETECTION SYSTEMS

Group Art Unit: 2856

Examiner: J. Politzer

Commissioner of Patents and Trademarks
Washington, D.C. 20231

APPEAL BRIEF TRANSMITTAL FORM

1. Transmitted herewith is an Appeal Brief Under 37 C.F.R. § 1.192 (in triplicate), which is being submitted further to the Notice of Appeal filed September 17, 2001.

2. Additional papers enclosed.

   [ ] Drawings: [ ] Formal [ ] Informal (Corrections)
   [ ] Information Disclosure Statement
   [ ] Form PTO-1449, ___ references included
   [ ] Citations
   [ ] Declaration of Biological Deposit
   [ ] Submission of "Sequence Listing", computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

3. Oral Hearing Under 37 C.F.R. 1.194

   [ ] Oral hearing is hereby requested.
   [ ] Fee under 37 C.F.R. 1.17(d) is enclosed.

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4. Extension of time

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

[X] Appellants petition for an extension of time, the fees for which are set out in 37 CFR 1.17(a)-(d), for the total number of months checked below:

Total months requested	Fee for extension	[fee for Small Entity]
[X] one month	$ 110.00	$ 55.00
[ ] two months	$ 390.00	$195.00
[ ] three months	$ 890.00	$445.00
[ ] four months	$1,390.00	$695.00

Extension of time fee due with this request: $ 110.00

If an additional extension of time is required, please consider this a Petition therefor.

5. Fee Payment

[ ] No fee is to be paid at this time.

[X] The Commissioner is hereby authorized to charge the amount of $320.00 for the Appeal Brief filing fee and one-month extension of time fee of $110.00 to Deposit Account No. 50-0310.

[X] The Commissioner is hereby authorized to charge any fees including fees due under 37 CFR 1.16 and 1.17 which may be required, or credit any overpayment to Deposit Account No. 50-0310.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS

Dated: 17 December 2001

By: Scott J. Anchell
Scott J. Anchell
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#19 Appeal Brief 12/20/01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: John E. COOK et al.	)	
	)	
Application No.: 09/165,772	)	Group Art Unit: 2856
	)	
Filed: 2 October 1998	)	Examiner: Politzer, J.
	)	
For: TEMPERATURE CORRECTION METHOD AND SUBSYSTEM FOR AUTOMOTIVE EVAPORATIVE LEAK DETECTION SYSTEMS	)	

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APPELLANTS' BRIEF UNDER 37 C.F.R. § 1.192

Commissioner for Patents
Washington, D.C. 20231

Sir:

This brief is in furtherance of the Notice of Appeal, which was filed on 17 September 2001, appealing the final rejection dated 15 March 2001. The fees required under 37 C.F.R. § 1.17(f), and any required petition for extension of time for filing this brief and the fees therefor, are being filed concurrently herewith. This brief is being filed in triplicate.

1. THE REAL PARTY IN INTEREST

The real party in interest is SIEMENS AUTOMOTIVE INCORPORATED (formerly, Siemens Canada Limited) of Chatham, Ontario, Canada.

2. RELATED APPEALS AND INTERFERENCES

Appellants are not aware of any other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the appeal.

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3. STATUS OF THE CLAIMS

The status of the claims is as follows:

Claims canceled: none.

Claims pending: 1-17 (Claims 4-16 stand withdrawn from consideration, but not canceled).

Claims allowed: none.

Claims rejected: 1-3 and 17.

Claims on appeal: 1-3 and 17.

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4. STATUS OF AMENDMENTS

Since the Final Office Action dated 15 March 2001, there have been no amendments filed in the application.

5. SUMMARY OF THE INVENTION

Appellants' invention relates generally to automotive fuel leak detection methods and systems. In one specific aspect, the invention relates to a temperature correction approach to automotive evaporative fuel leak detection. See page 1, lines 9-11, of Appellants' specification.

Computing a temperature-compensated pressure value eliminates or reduces false positive indications of fuel system leaks that can be triggered by temperature changes. For example, the temperature-compensated pressure measurement may be used to draw an inference regarding the existence of a leak, while eliminating or reducing the false detection of a leak arising as a result of temperature fluctuations in a fuel tank. See Appellants' Abstract of the Disclosure.

Appellants' invention uses either a positive or a negative pressure differential, relative to atmosphere, to check for a leak in an automotive fuel system. Pressure change over a given period of time is monitored, and the existence of a leak can be inferred by the pressure change. See page 1, lines 15-18, of Appellants' specification. The reliability of detecting a leak is dependent on a number of fuel system pressure stability factors including: a) uniform pressure throughout the fuel system, b) no movement in the fuel tank, and c) no changes in the fuel system volume. See page 1, line 20, to page 2, line 4, of Appellants' specification.

Appellants' have discovered that, in addition to pressure stability factors a), b), and c), the thermal stability of the fuel system also affects leak detection accuracy. Specifically, Appellants' have discovered that a more reliable leak detection test can be conducted if the temperature of the fuel vapor in the gas tank, i.e., above the liquid fuel, is stable. See page 3, lines 17-22, of Appellants' specification. Conversely, false positive indications of leaks can result from tests performed on a fuel system that is not thermally stable.

Appellants' have also recognized that achieving thermal stability is not as easy as achieving pressure stability. For example, a leak is likely to be falsely detected any time heat is added to a fuel tank, e.g., by refueling with warmer than ambient fuel. Whereas pressure stabilization as a result of this refueling occurs relatively quickly, a longer period is required to reach thermal stability. See page 3, line 24, to page 4, line 5, of Appellants' specification.

A long stabilization period is commercially disadvantageous. However, according to Appellants' invention, a leak detection test with appropriate temperature compensation, which can eliminate this long stabilization period, can be conducted before the temperature of the fuel vapor in the fuel tank has stabilized. See page 4, lines 7-12, of Appellants' specification.

In order to conduct a reliable leak detection test on a fuel system that may be thermally unstable, Appellants' invention computes a temperature corrected (or compensated) vapor pressure and compares this temperature corrected vapor pressure with a measured vapor pressure. See page 4, lines 20-22, of Appellants' specification.

In order to compute a temperature corrected vapor pressure (P_c), Appellants' have assumed that the fuel vapor in the fuel tank obeys the ideal gas law:

$$PV = nRT$$

where P = pressure; V = volume, n = mass, R = gas constant, and T = temperature. Fundamentally, the ideal gas law teaches that fuel vapor pressure in a fuel tank will decrease as the fuel vapor cools. However, this pressure decrease can be misinterpreted as leakage. See page 5, lines 4-17 of Appellants' specification.

Appellants' invention compensates for the effect of temperature change in the constant volume of a fuel tank, thus eliminating or reducing the possibility of misinterpreting the results of a leakage test. According to one example of Appellants' invention, fuel vapor pressure and temperature are measured at two points in time. Appellants' assume that the change in fuel vapor mass (n) is negligible, and that the fuel vapor gas constant (R) and fuel vapor volume (V) are constant. As such, the ideal gas law can be expressed as:

$$P_2 = P_1(T_2/T_1).$$

This relationship implies that the an increase in the temperature from T_1 to T_2 will cause the pressure to increase from P_1 to P_2, in a closed system. See page 5, line 19, to page 6, line 2, of Appellants' specification.

Appellants' invention computes that the temperature corrected vapor pressure (P_c) as follows:

$$P_c = P_1 - (P_2 - P_1)$$

or, substituting for P2, as follows:

$$P_c = P_1(2\text{-}T_2/T_1).$$

See page 6, lines 4-15, of Appellants' specification.

Thus, Appellants' invention will reach an accurate result more quickly than heretofore known systems, which require a lengthy thermal stabilization period, and will allow for leakage measurement to take place in what was previously considered to be an unstable fuel system. See page 6, lines 17-30, of Appellants' specification.

6. ISSUES

The issues presented for review are whether claims 1-3 are patentable under 35 U.S.C. § 112, second paragraph, and whether claims 1-3 and 17 are patentable under 35 U.S.C. § 103(a) over U.S. Patent No. 3,413,840 to Basile et al. (Basile)

7. GROUPINGS OF CLAIMS

Claims 1-3 and 17 stand or fall together.

8. ARGUMENTS

The Claims Comply With 35 U.S.C. § 112, Second Paragraph

The final rejection under 35 U.S.C. § 112, second paragraph, is improper and should be withdrawn.

First, the language of claim 1 is definite. See MPEP § 2173.05(b)(D). The use of the term "substantially" is definite insofar as it allows for measuring and recording the first temperature within a span very close to the first point in time. See page 8, lines 28-30, of Appellants' specification. Second, the question regarding why the known pressure at the first point in time has to be temperature compensated suggests a failure to appreciate Appellants' invention. The language of claim 1 regarding temperature compensation is definite such that one of ordinary skill in the art would understand the claimed invention. Appellants' claim a method that includes comparing a computed pressure with a measured pressure to detect a leak. The computed pressure, which is based on the known pressure at a first point in time and the temperatures at the first point in time and at a second point in time, is compared to the measured pressure at the second point in time. Thus, Appellants' invention includes computing a compensated pressure that is, at least in part, derived from a known pressure, as opposed to *per se* compensating the known pressure. Third, the "temperature-compensated pressure" referred to in claim 1 is based on the previously measured values of first temperature at the first point in time and the second temperature at the second point in time. Thus, this temperature compensated pressure is computed at such time as the second temperature is measured, i.e., no earlier than at the second point in time. Finally, P_1 in claim

3 is the pressure at the first point in time. Support for this may be found in Appellants' specification at page 8, lines 18-26.

It is respectfully submitted that the form of claims 1-3 and 17 is definite to a person possessing the ordinary level of skill in the pertinent art, and that the final rejection under 35 U.S.C. § 112, second paragraph, should be withdrawn.

The Claims Are Non-obvious

The final rejection under 35 U.S.C. § 103(a) of independent claims 1 and 17, as well as claims 2 and 3 that ultimately depend from independent claim 1, is improper and should be withdrawn.

Independent claim 1 recites a combination of features including "measuring and recording a first temperature of the vapor at substantially the first point in time; measuring and recording a second temperature and a measured pressure of the vapor at a second point in time; computing a temperature-compensated pressure based on previously measured values; and comparing the temperature-compensated pressure with the pressure measured at a second point in time to detect a leak."

Independent claim 17 recites a combination of features including "measuring and recording a first temperature and a first vapor pressure in the fuel system at a first point in time; measuring and recording a second temperature and a second vapor pressure in the fuel system at a second point in time; compensating the first vapor pressure based on the first and second temperatures, thereby defining a temperature-compensated first vapor pressure; and comparing the temperature-compensated first vapor pressure with the second vapor pressure to detect a leak in the fuel system between the first and second points in time."

As discussed in Appellants' specification at page 3, line 24, to page 4, line 5, changes in gas tank temperature affect the ability to accurately indicate the existence of a leak in an automotive fuel system. Thus, as demonstrated by the equation in the present application at page 6, line 15, a temperature-compensated pressure, P_c, is calculated by compensating the initial pressure, P_1, based on a factor derived from the initial and subsequent temperatures, T_1 and T_2 (i.e., the derived factor being $2 - T_2 / T_1$). Then, as discussed in Appellants' specification at page 6, lines 21-25, the temperature-compensated pressure, P_c, is compared to the subsequently measured pressure, P_2, to detect whether or not leakage from the fuel system has occurred. Thus, as discussed in Appellants' specification at page 6, lines 25-30, the

claimed invention is able to reach an accurate determination of leakage without waiting for the fuel system to stabilize, i.e., leakage can be determined in an unstable fuel system.

It is respectfully submitted that Basile fails to teach or suggest Appellants' invention for at least the following four reasons: 1) Basile is not directed to a leak detection system for an automotive fuel system; 2) Basile is not directed to a leak detection system in which there is negligible weight transfer; 3) Basile is not directed to a leak detection system that includes the computation of compensation; and 4) Basile is not directed to a system that depends on temperature changes.

First, Basile is directed to a leak detection system for double walled tanks of sea going vessels transporting cargoes of cryogenic liquefied gases. It is respectfully submitted the Basile does not teach or suggest to one of skill in the automotive arts how to provide leak detection for an automotive vehicle fuel system of including a single walled fuel tank from which fuel for operating the vehicle is withdrawn.

Second, Basile shows (Figures 1 and 2, and column 1, lines 12-18) a leak detector for a tank located within a constant volume space surrounding the tank. Basile states that temperature and pressure sensors are located within this space. Basile further states that leak conditions in the tank "change the weight of gas in the space which affects the signals developed by the pressure sensor but which does not affect significantly those generated by the temperature sensor." Thus, Basile shows a leak detection system that is based on sensing an appreciable transfer of mass with respect to the space. This is in contrast to Appellants' invention in which changes in fuel vapor mass are taken to be negligible.

Third, Basile states that the transfer of mass affects the signal developed by the pressure sensor, but does not affect the signal generated by the temperature sensor. This is another significant distinction with respect to Appellants' invention. Basile's pressure transducer 5 senses actual pressure in the outer tank space 3. See column 3, lines 11-15, of Basile. Basile's temperature transducer 6 outputs a temperature proportional signal, which is converted to a signal that is proportional to a calculated pressure. See column 3, lines 16-25, of Basile. Basile then compares the actual pressure, which is sensed by the pressure transducer 5, to the calculated pressure, which is determined based on the temperature transducer 6. See column 3, lines 25-28, of Basile. This comparison is unaffected "even if temperature in the outer tank space varies because temperature is a parameter common to the calculated standard *and* the actual pressure" (column 3, lines 31-33, of Basile). This is in contrast to Appellants' invention, which measures changes in temperature values, and

computes a temperature-compensated pressure based on the changes in the temperature values.

Fourth, Basile states that "[t]his leak detection system will be unaffected by any change in temperature of the gas in the barrier [space 3] due to a change in ambient temperature, tank level, etc. since the computed pressure, P_c, is for a given weight at the actual temperature in the barrier. Thus, since actual temperature is a common factor in the actual and calculated terms, it can be treated as a constant without introducing errors into the final readings" (column 3, lines 58-65, of Basile). In contrast to Appellants' invention, Basile speaks against detecting leaks with a system that includes measuring temperature variations.

Basile compares calculated and measured pressure values at a common point in time to detect leakage, and consequently, there is no teaching or suggestion of comparing a temperature-compensated vapor pressure with respect to a vapor pressure measured at a different point in time. Essentially, Basile fails to appreciate the problem addressed and solved by Appellants' invention, i.e., leak detection in a system that is unstable due to temperature fluctuation. Instead, Basile is directed to detecting leaks in a system that is does not require thermal stabilization.

MPEP § 2143.03 points out that "[t]o establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art. In re Royka, 409 F.2d 981, 180 USPQ 580 (CCPA 1974)." Therefore, Appellants respectfully assert that the rejection under 35 U.S.C. § 103(a) should be withdrawn because Basile does not teach or suggest each features of independent claims 1 and 17. Furthermore, Appellants respectfully assert that dependent claims 2 and 3 are allowable at least because of they recite the same allowable combination of features as claim 1, as well as reciting additional features that further distinguish over Basile.

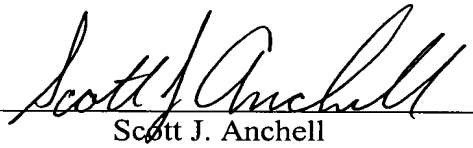
9. CONCLUSION

It is respectfully submitted that Basile fails to teach or suggest the combination of features recited in independent claims 1 and 17. Moreover, it is respectfully submitted that claims 2 and 3, which depend either directly or indirectly from independent claim 1, are also patentable inasmuch as they recite the same combinations of allowable features, as well as reciting additional features that further distinguish over the applied prior art.

In view of the foregoing, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the final rejections and allow claims 1-3 and 17. If there are any other fees due in connection with the filing of this Appeal Brief, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account No. 50-0310.

Respectfully submitted,
MORGAN LEWIS & BOCKIUS LLP

Dated: 17 December 2001

By: 
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APPENDIX

1. A method for automotive evaporative leak detection for use with a system including a tank having vapor at a known pressure at a first point in time, the method comprising:

measuring and recording a first temperature of the vapor at substantially the first point in time;

measuring and recording a second temperature and a measured pressure of the vapor at a second point in time;

computing a temperature-compensated pressure based on previously measured values; and

comparing the temperature-compensated pressure with the pressure measured at a second point in time to detect a leak.

2. The method according to claim 1, wherein temperature compensated pressure is computed as a function of the pressure measured at the first point in time and of the measured temperatures.

3. The method according to claim 2, wherein the function comprises the expression:

$P_c = P_1(2-T_2/T_1)$

where P_c is temperature compensated pressure, T_1 is the temperature at the first point in time and T_2 is the temperature at the second point in time.

17. A method for evaporative leak detection in an automotive fuel system, the method comprising:

measuring and recording a first temperature and a first vapor pressure in the fuel system at a first point in time;

measuring and recording a second temperature and a second vapor pressure in the fuel system at a second point in time;

compensating the first vapor pressure based on the first and second temperatures, thereby defining a temperature-compensated first vapor pressure; and

comparing the temperature-compensated first vapor pressure with the second vapor pressure to detect a leak in the fuel system between the first and second points in time.